

Subcontractor Report

Report on Solar Water Heating Quantitative Survey

December 1997 - September 1998

Focus Marketing Services
Westlake Village, California



NREL

National Renewable Energy Laboratory

1617 Cole Boulevard
Golden, Colorado 80401-3393

NREL is a U.S. Department of Energy Laboratory
Operated by Midwest Research Institute • Battelle • Bechtel

Report on Solar Water Heating Quantitative Survey

December 1997 - September 1998

Focus Marketing Services
Westlake Village, California

NREL Technical Monitor: R. Hewett

Prepared under Subcontract No. AAD-7-17646-01



NREL

National Renewable Energy Laboratory

1617 Cole Boulevard
Golden, Colorado 80401-3393

NREL is a U.S. Department of Energy Laboratory
Operated by Midwest Research Institute • Battelle • Bechtel

Contract No. DE-AC36-98-GO10337

TABLE OF CONTENTS

Background and Objectives	1
Method	2
Conclusions and Recommendations	3
Detailed Findings	
<u>Awareness and Usage of Various Water Heating Systems</u>	6
Awareness of Water Heating Systems	6
Source of Solar Water Heating Awareness.....	7
Usage of Water Heating Systems.....	8
<u>Image of Solar Water Heating Systems</u>	9
Perceived Advantages of Solar Water Heating Systems.....	9
Perceived Disadvantages of Solar Water Heating Systems	10
Importance of Purchase Consideration Factors	11
Agreement with Attitudinal Statements	12
Perceptions of Solar Water Heating System Cost	13
<u>Past Purchase Interest in Solar Water Heating</u>	14
Consideration of Solar Water Heating	14
Builder Influence	15
Effect of Solar Water Heating on Home Purchase Interest.....	16
<u>Purchase Interest in New Solar Water Heating Concept</u>	17
Interest Level in New Solar Water Heating Systems.....	17
Interest Level if Break-Even.....	18
Interest Level if Financially Ahead.....	19
Savings Required to Elicit Strong Interest.....	20
Purchase Interest Summary.....	21
<u>Respondent Profiles</u>	22
Homes	
Demographics	
Appendix	24
Questionnaire	

BACKGROUND AND OBJECTIVES

While technology and aesthetics of solar water heating units and panels have greatly improved during the past twenty years, the number of homeowners installing them has not grown as dramatically.

Currently, the National Renewable Energy Laboratory (NREL) and the Solar Energy Industries Association (SEIA) are working together in an effort to develop effective strategies that will grow this industry.

To this end, a large scale research study has been commissioned that involves gaining a better understanding of the marketplace from the perspective of home builders and architects, and from the perspective of home buyers.

A two phase research project was conducted among home owners to obtain input from the consumer market. Phase one involved a series of qualitative focus group sessions among both solar users and non-users. The input from this phase was used in developing a quantitative questionnaire for phase two of the research.

Phase two, the quantitative telephone survey, was conducted among new home owners who do not have solar water heating in order to:

- Gain an understanding of consumer awareness and images of solar water heating systems.
- Identify the extent or lack of consumer knowledge and understanding of solar water heating systems.
- Identify the key barriers to purchase and ways to generate increased purchase interest.
- Determine the purchase interest levels in newer “skylight like” solar systems.

The following report is based upon data collected in the phase two quantitative survey.

METHOD

The method used for this quantitative research was as follows:

Who: Three hundred interviews were conducted; one hundred across each Florida, Arizona, and California.

Screening criteria for all respondents were:

- Own the single family unit home they are currently living in
- Owned this home for one year or less
- Do not have solar water heating on this home

What: Telephone interviews lasting 15 minutes each.

When: Interviews were conducted from February 12 – 17, 1998.

Question Areas: (See Appendix for questionnaire)

- Awareness and usage of various water heating systems
- Source of solar water heating awareness
- Advantages/disadvantages of using solar water heating
- Consideration of solar water heating systems / barriers to consideration
- Builder influence
- Purchase interest in “skylight-type” solar system based upon alternate savings scenarios
- Cost perceptions
- Importance ratings of purchase decision factors
- Agreement with attitudinal statements
- Respondent demographics

Statistical Testing:

Statistical testing was conducted across all subgroups analyzed. Throughout the report statistically significant differences are noted between subgroups at the 90% level of confidence. This means that if this study were replicated among the target sample, differences between the same subgroups would occur nine out of ten times tested.

Directional differences are noted where subgroups differ at the 80% level of confidence.

When differences between groups are not discussed, it may be assumed that no statistical differences exist between subgroups.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION 1:

While a large portion of respondents are aware that solar water heating does exist, it is not something that is top-of-mind, or something they think about when looking for a new home.

- Four in ten respondents mention solar when asked to list all types of water heating on an unaided basis, and nine in ten are aware of solar when asked if they have heard of it.
- Only three percent of all respondents recall visiting a new community that offered solar water heating when they recently purchased their home.
- Over nine in ten respondents (96%) did not consider solar water heating when they recently purchased their new home, with the primary reasons being that they simply did not think about it, they did not know it was available, or the home was already built with something else.

CONCLUSION 2:

Builders are not currently doing much to help the solar industry, but clearly have the opportunity to play a strong role in building sales of solar water heating systems in addition to possibly enhancing their own sales efforts.

- Almost none of those aware of solar water heating cited builders as being a source of awareness, and as previously noted, buyers are not exposed to solar when they visit new home communities.
- While builder recommendation is not rated as important as other solar purchase consideration factors, one-third rate this factor as being highly important. And over three-fourths of all respondents indicate that if their builder had recommended solar they would have either seriously considered it or wanted to learn more.
- Over four in ten respondents agree that solar should be standard equipment on all new homes. Further, when asked how solar being equipped on their home would have effected their purchase interest, one-fourth would have been more interested in purchasing, and an additional two-third feel it would have made no difference in their interest.
- Also, four in ten respondents indicate that they would be willing to pay something more on their mortgage, an average of \$21.60 per month, in order to have one of the new types of solar systems installed while their home was being built.

CONCLUSION 3:

While the key motivating factor to purchasing solar is to save money, many respondents express concern about the overall economics of installing a solar system.

- The large majority of these respondents view saving money as the key advantage to owning a solar water heating system.
- However, many respondents clearly express concern regarding the initial and subsequent costs associated with owning a solar system. Specifically:
 - The disadvantage of solar noted most often is “too expensive to install” (29%).
 - Four of the five most important purchase decision factors focus on the overall financial picture – maintenance required, warranty provided, monthly money savings, and fully installed price.
 - Only about half of the total respondents agree that “solar energy makes economic sense,” and/or that the “energy savings would outweigh the purchase costs.” Further only four in ten agree that solar would require very little maintenance.

CONCLUSION 4:

There appears to be a sizeable amount of interest in the newer types of solar water heating systems, assuming the solar industry can make these systems readily available and can generate much stronger awareness of these systems among home buyers.

- When the new type of solar water heating system was briefly described to these home buyers, four in ten respondents in total indicate that they would be willing to pay something more on their mortgage to have this type of system.
- An additional thirteen percent of the total respondents would be extremely interested in this new type of solar water heating system if they were assured of simply breaking-even each month.

RECOMMENDATIONS

- To begin with, the solar industry needs to create a communications program that will effectively generate increased awareness of the newer types of solar water heating systems that are available.

In communicating information about the newer types of solar water heating systems, money savings should be the primary message, followed by a low maintenance message and a strong warranty message.

Although appearance does not seem to be a strong barrier to purchase among these respondents, it is an important factor that should not be overlooked. Communications for solar systems should show strong visuals of the newer systems, as they are clearly much more attractive than the older systems that some respondents may still associate with solar energy.

While respondents like the idea of helping the environment and using clean energy, they already understand that solar energy provides this. Therefore, the environmental message can be a secondary message simply to remind consumers that they can feel good about making their decision to purchase solar.

- NREL and SEIA should push harder to convince builders to install solar water heating systems on their new homes as standard equipment. Based upon the findings in this research, while buyers do not consciously ask for solar, they would be very open to having this equipment on their new homes. And many are even willing to pay more on their mortgage in order to have solar water heating.

DETAILED FINDINGS

AWARENESS AND USAGE OF VARIOUS WATER HEATING SYSTEMS

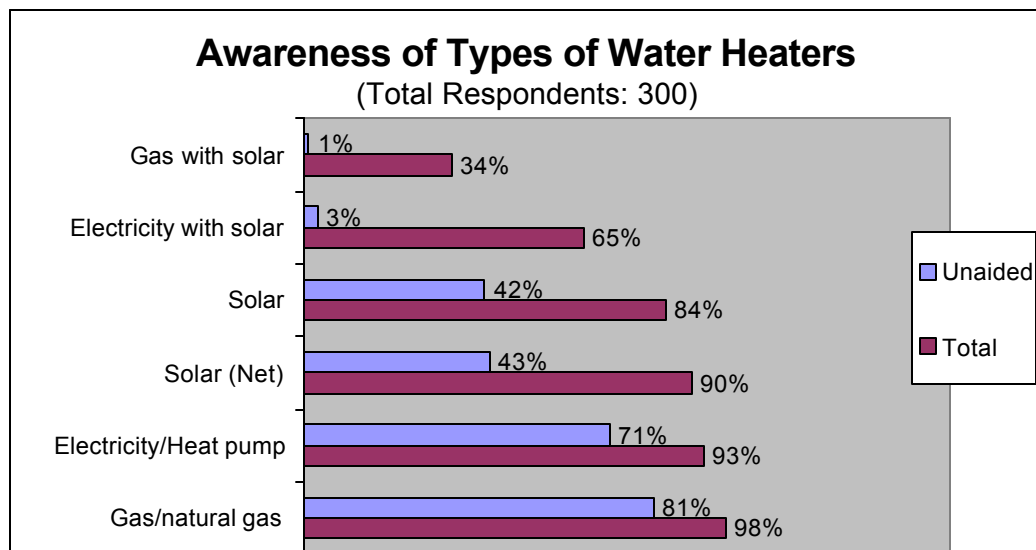
While respondents were all screened not to be current users of solar water heating, a substantial portion are aware of solar and a small portion have had past experience with solar water heaters. Water heating awareness is generated from a variety of sources, with books and magazines being the most common source.

Gas water heaters command the strongest awareness and usage levels among this sample, followed closely by electric water heaters.

AWARENESS OF WATER HEATING SYSTEMS

Over four in ten (43%) of all respondents are aware of solar water heating on an unaided basis, with nine in ten (90%) being aware of solar in total.

Awareness of solar working in conjunction with electricity is almost double that of awareness of solar working in conjunction with gas (65% versus 34%).

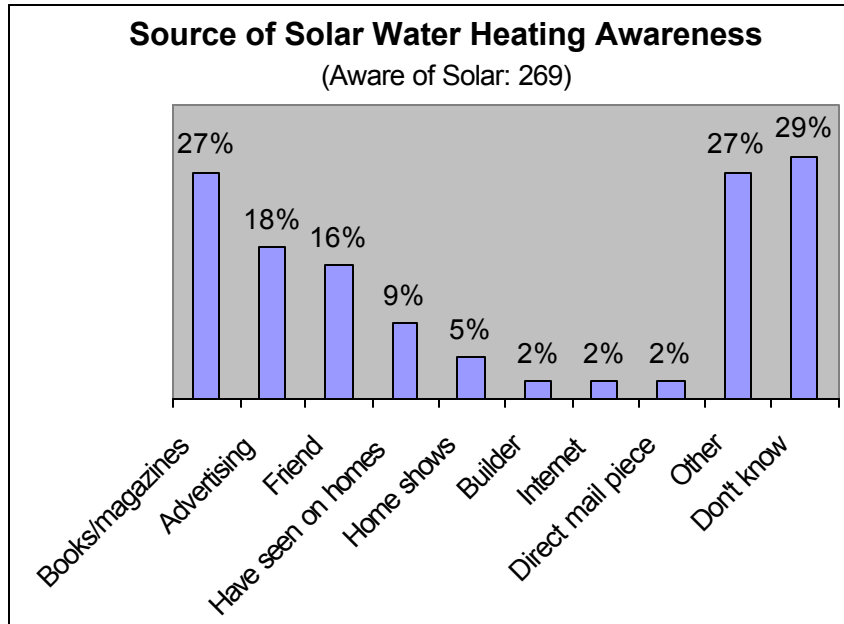


Q.1a: Please tell me all of the ways or methods that you know of to heat the water in your home.

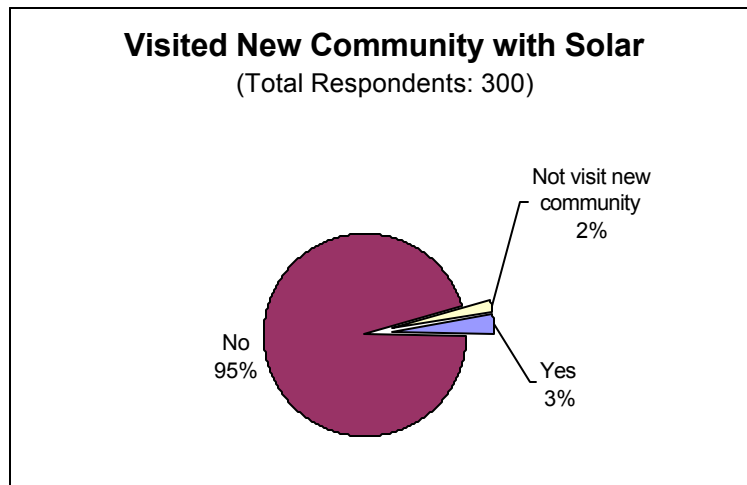
Q.1b: Have you ever heard of heating the water in your home using (type)?

SOURCE OF SOLAR WATER HEATING AWARENESS

Sources of solar water heating awareness are very fragmented, with no medium representing a strong source among even one-third of those who are aware. Books and magazines are the most common source of solar water heating awareness (27%).



Even when specifically asked about new home communities being sources of awareness, almost none (3%) mention seeing solar offered at a community they visited.

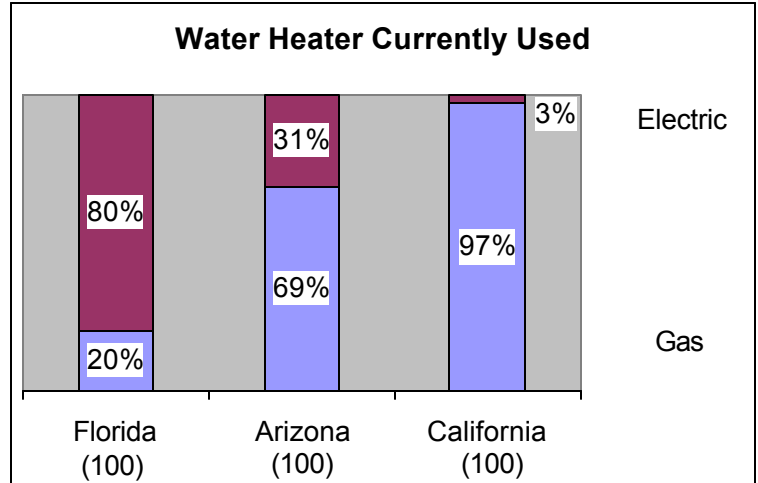
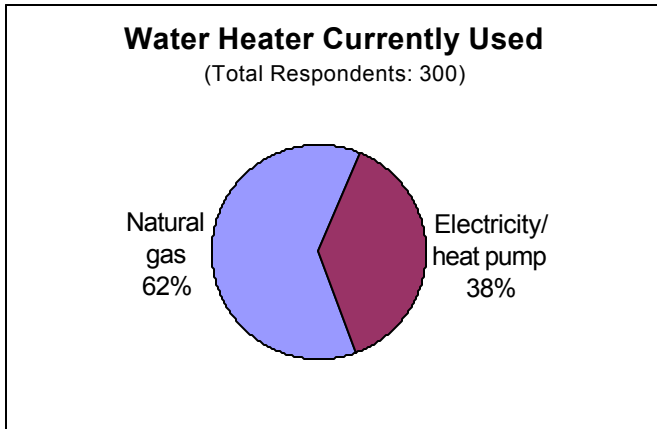


Q.2: From what sources have you heard anything about solar water heaters?

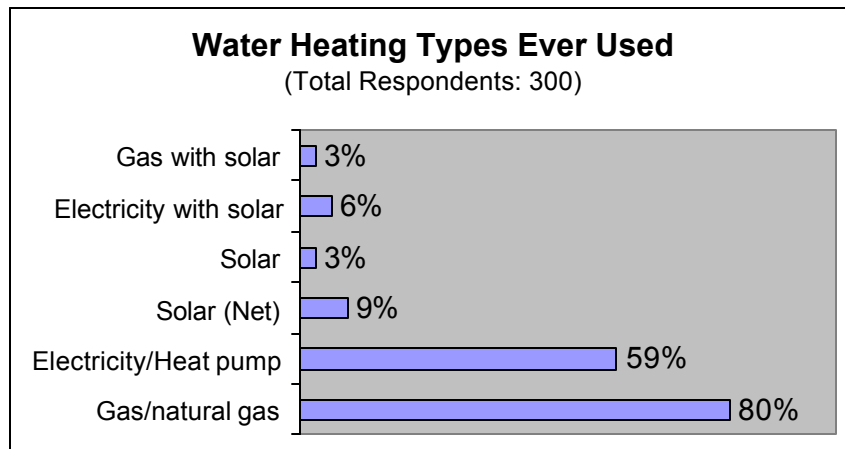
Q.5: Did any of the new home communities you visited offer solar water heating?

USAGE OF WATER HEATING SYSTEMS

The majority of respondents surveyed currently use gas water heaters (62%), with almost four in ten using electric water heaters. Electric water heaters clearly dominate the Florida market, whereas gas heaters are more dominant in Arizona and especially California.



While respondents were screened not to be current users of solar, almost one in ten (9%) have past experience with solar water heating. The majority of respondents have experience with gas (80%) and/or electric (59%) water heaters.



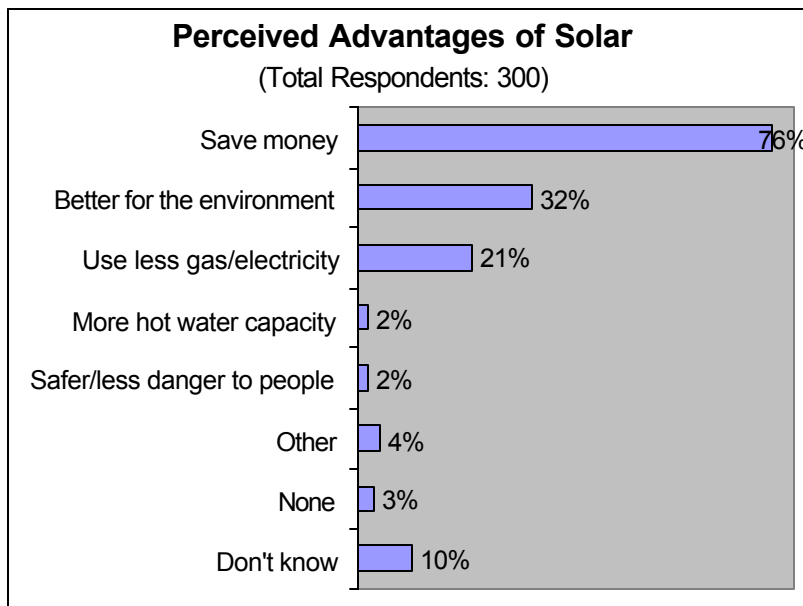
Q.F: Which of the following most accurately describes the manner in which the water in your home is heated?
Q.1c: Have you ever lived in a home that used (type) of water heating?

IMAGE OF SOLAR WATER HEATING SYSTEMS

Overall, these respondents appear to be stating that the only reason to purchase a solar water heater is to save money, but they are not certain that one would actually save money by doing so. Specifically, many respondents feel that solar units are too expensive to install or simply have no idea how much it would cost, and they express strong concerns regarding the amount of maintenance and types of warranties offered. Many respondents indicate that they are not sure whether owning solar makes economic sense.

PERCEIVED ADVANTAGES OF SOLAR WATER HEATING

Clearly the key perceived advantage of using solar water heating on an unaided basis is to “save money” (76%). At a distant margin, about one-third feel that helping the environment is a secondary perceived advantage.

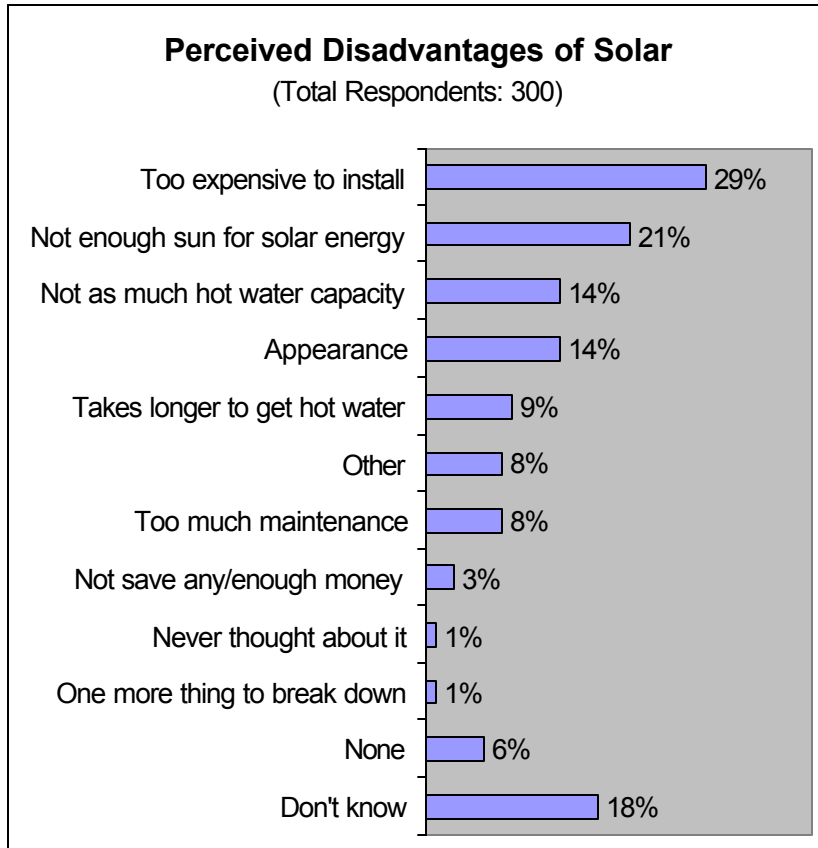


Q.3: *What do you think the advantages of using solar energy to help heat the water in your home would be? What other advantages would there be?*

PERCEIVED DISADVANTAGES OF SOLAR WATER HEATING

The two most common perceived disadvantages of solar water heating on an unaided basis include “being too expensive to install” (29%) and “not enough sun for solar energy to work” (21%).

Water capacity and appearance are perceived as disadvantages by fewer than one in five respondents on an unaided basis (14% each).



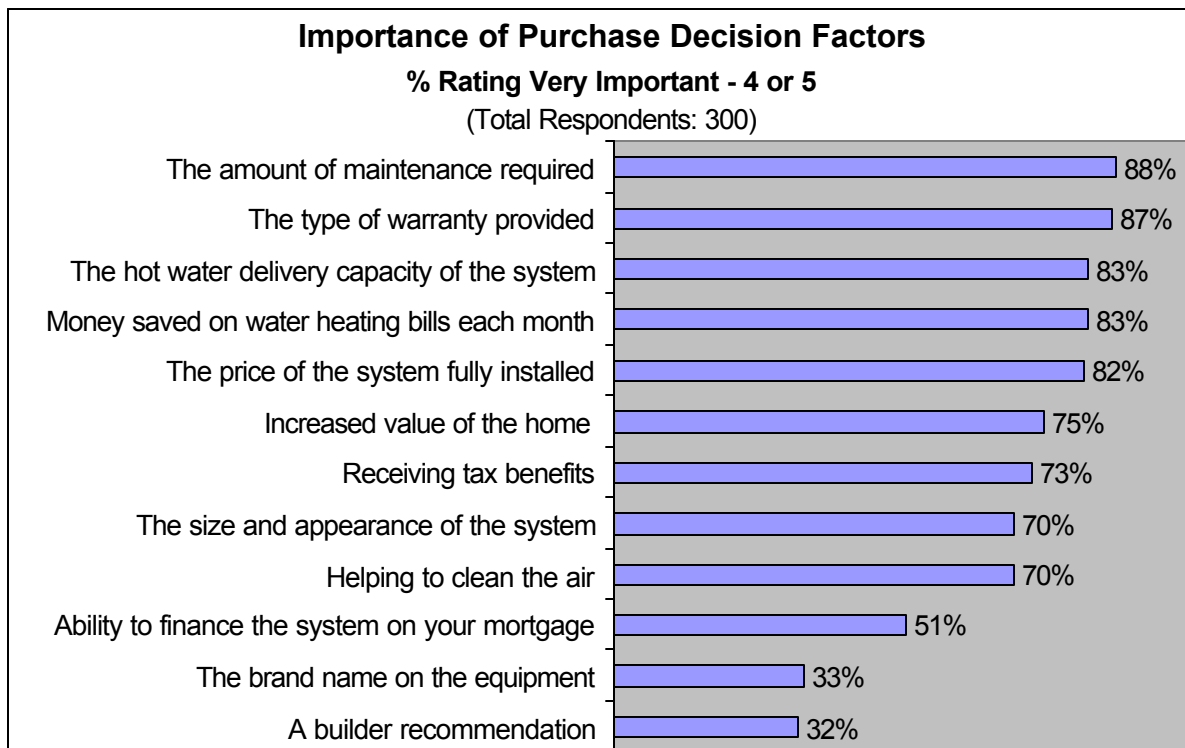
Q.4: What do you think the disadvantages of using solar energy to help heat the water in your home would be? What other disadvantages would there be?

IMPORTANCE OF PURCHASE CONSIDERATION FACTORS

When asked to rate the importance of a variety of factors on their decision to purchase solar water heating if they were interested in it, almost all of these consideration factors are considered to be highly important by the majority of respondents.

Interestingly, those who do express positive purchase interest in solar water heating rate all of the factors as being significantly more important than do those who do not have any interest in purchasing solar.

Brand name, builder recommendations and financing the system on a mortgage are clearly less important to these respondents than are factors dealing with money savings, maintenance, and product performance.



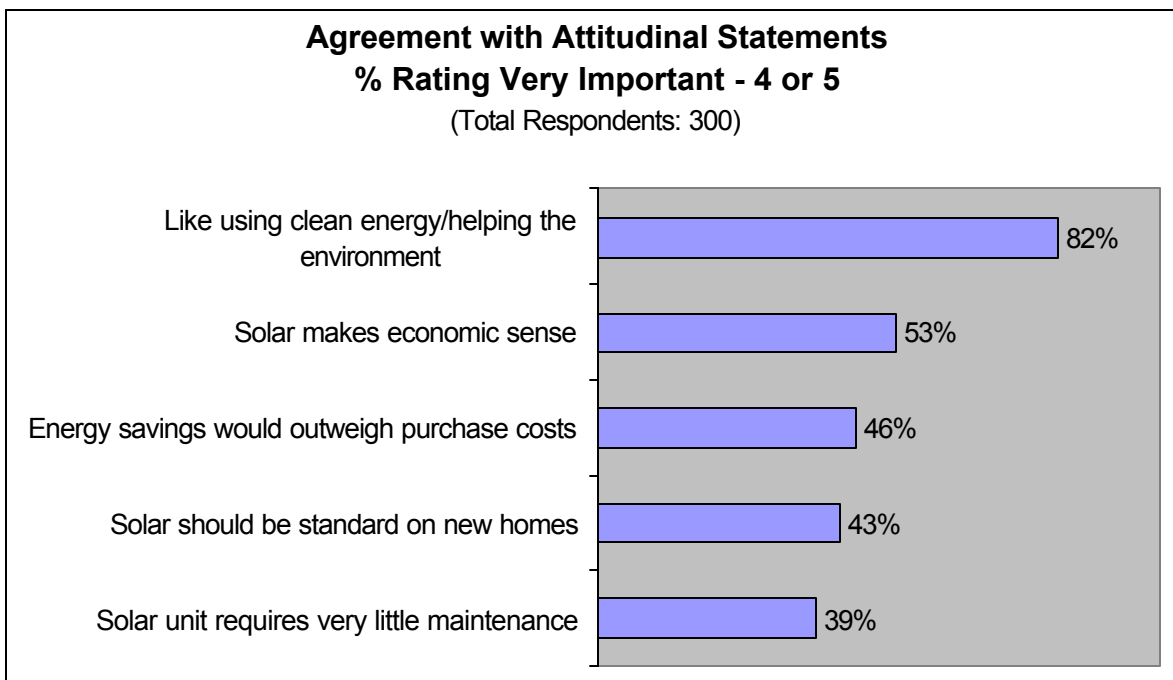
Q.17: Using a scale of one to five, where a one means "not at all important" and a five means "very important," how important would each of the following things be in your decision to purchase a solar water heating system for your home if you had been interested in one?

AGREEMENT WITH ATTITUDINAL STATEMENTS

While over eight in ten (82%) respondents strongly agree that they like helping the environment, agreement with other attitudinal statements toward solar do not elicit this level of agreement.

Although money savings was noted most often as being an advantage of using solar, only about half strongly agree that solar makes economic sense (53%) or that the savings would outweigh the purchase costs (46%).

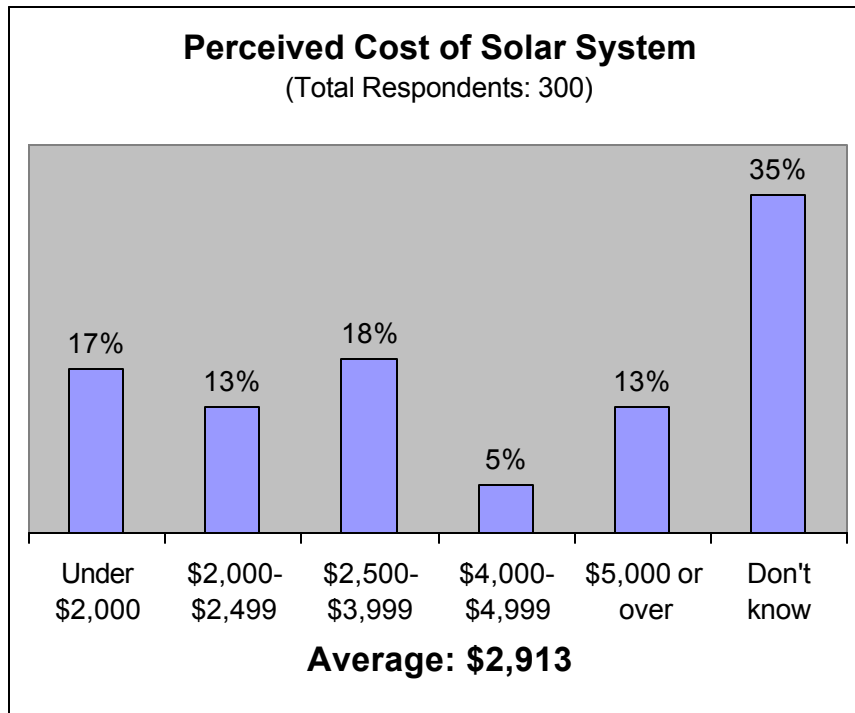
Over four in ten (43%) strongly agree that solar should be standard equipment on new homes being built.



Q.18: Using a scale of one to five again, only now a one means “completely disagree” and a five means “completely agree,” how much do you agree or disagree with each of the following statements?

PERCEPTIONS OF SOLAR WATER HEATING SYSTEM COST

On average, respondents feel that the cost of a fully installed solar water heating system would run just under three thousand dollars. However, over one-third (35%) of these respondents admit that they have no idea what the cost of this type of system would be.



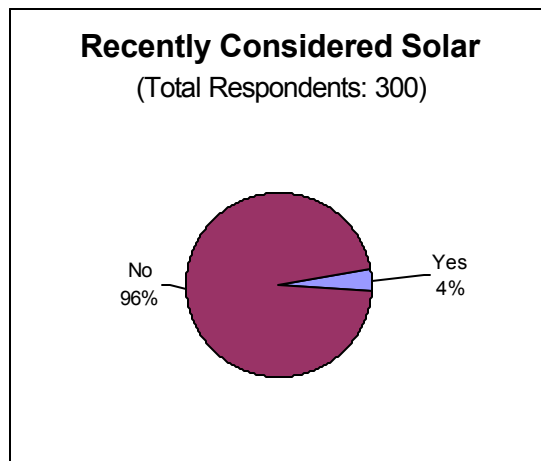
Q.16: How much do you think that a typical solar water heating system costs, fully installed?

PAST PURCHASE INTEREST IN SOLAR WATER HEATING

CONSIDERATION OF SOLAR WATER HEATING

Almost none (4%) of these respondents even considered solar water heating when they recently purchased their home. Among the twelve respondents who did consider solar, they generally did not purchase either because it was not available or it was too expensive.

Lack of awareness and/or lack of availability appear to be the primary reasons that almost all respondents did not consider solar water heating. Those who consciously rejected solar water heating appear to be in a small minority.



Reasons for Not Purchasing Solar

(Among those who did Consider Solar: 12)

Not available/offered	33%
Too expensive	33%
Other	25%
Builder never mentioned it	17%
Home already built	8%
Not attractive / unsightly	8%
Not save any/enough money	8%
Do not know enough about it	8%
Don't know	8%

Reasons for Not Considering Solar

(Among those who did not Consider Solar: 288)

Didn't think about it	30%
Builder never mentioned it	25%
Home already built	12%
Not available/offered	12%
Do not know enough about it	10%
Too expensive	9%
Other	8%
Association not allow it	4%
Not attractive / unsightly	2%
Not save any/enough money	2%
Builder recommended against it	1%
Too difficult to install	1%
Friend recommended against it	*
Don't know	4%

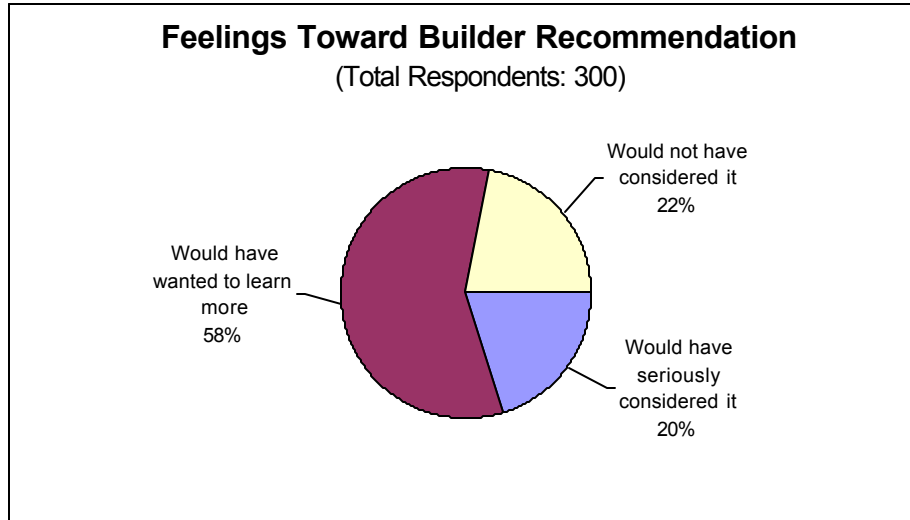
Q.6: Did you consider a solar water heater when you recently purchased this home?

Q.7: (IF YES) Why did you decide against purchasing a solar water heating unit?

Q.8: (IF NO) Why did you not consider a solar water heater when you purchased this home?

BUILDER INFLUENCE

While these respondents rate builder recommendations as being less important than other purchase consideration factors, three-fourths (78%) do agree that they either would have seriously considered solar or would have wanted to learn more about solar if their builder had recommended it to them.

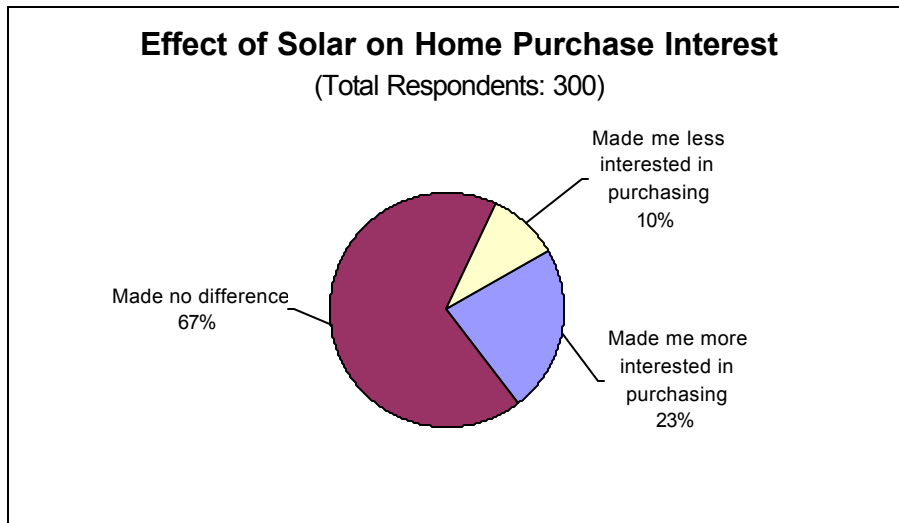


Q.9: Which of the following statements is most accurate? If my builder had mentioned that solar water heaters were available...

EFFECT OF SOLAR WATER HEATING ON HOME PURCHASE INTEREST

Consistent with many respondents feeling that solar water heating should be standard equipment on new homes, almost one-fourth (23%) of these respondents indicate that they would have been even more interested in purchasing their home if it had been equipped with solar. And another two-thirds (67%) feel it would have made no difference in their interest to purchase their home.

Only a small number of respondents (10%) indicate that they would have been less interested in purchasing their home if it had been equipped with solar, primarily out of lack of knowledge.



Reasons for Decreased Purchase Interest
(Among those who are "less interested": 30)

<u>Lack of Product Knowledge (Net)</u>	<u>40%</u>
Know nothing about it	17%
Don't know enough	17%
Don't understand how solar works	7%
<u>Prefer Gas/Electric (Net)</u>	<u>30%</u>
Have more faith in gas/electric	13%
I'm used to gas/electric	10%
Other prefer gas/electric comments	7%
<u>They look ugly</u>	<u>17%</u>
<u>Reputation (Net)</u>	<u>17%</u>
Neighbors have had solar problems	7%
Other reputation comments	10%
<u>Too much maintenance required</u>	<u>13%</u>
<u>Cost/price is too much</u>	<u>7%</u>
<u>Miscellaneous other mentions</u>	<u>7%</u>

Q.10: *If a solar water heater had been standard on your home, how would it have effected your interest in purchasing this home?*

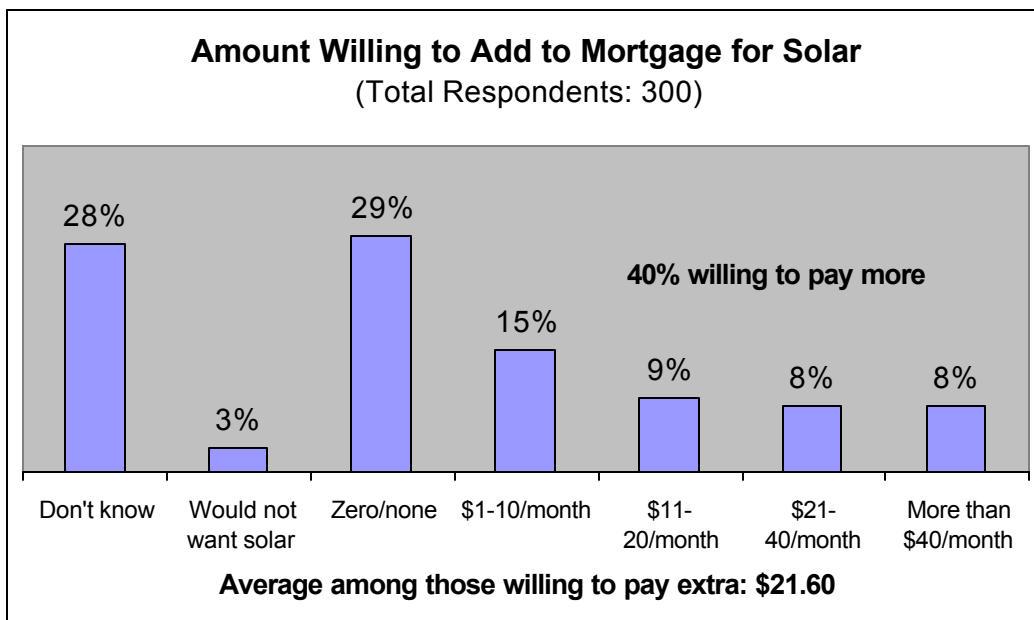
Q.11: *(IF LESS INTERESTED) Why is that?*

PURCHASE INTEREST IN NEW SOLAR WATER HEATING CONCEPT

INTEREST LEVEL IN NEW SOLAR WATER HEATING SYSTEMS

The majority of respondents seem to be open to the idea of having solar water heating as standard equipment on new homes, and four in ten (40%) would be willing to pay more on their mortgage to have it. Among those willing to pay something incremental on their mortgage, the average amount they would add is just over twenty dollars a month.

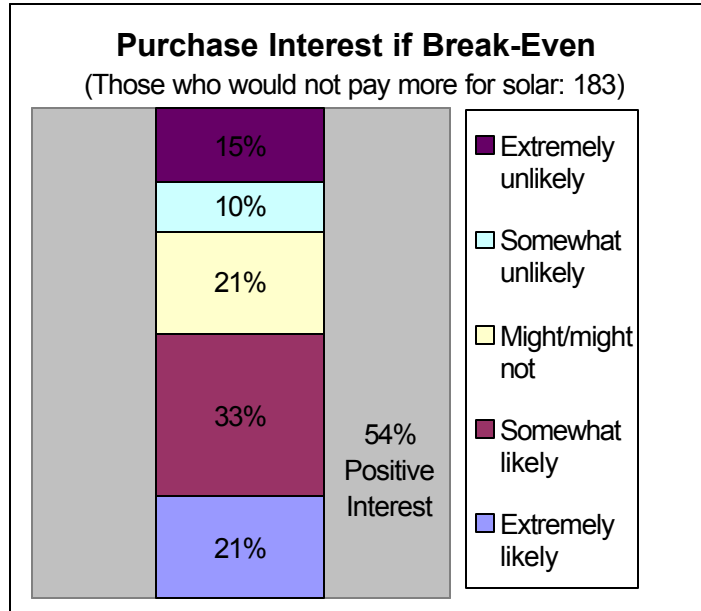
Three in ten respondents would not want to pay anything additional on their mortgage, and another three in ten are not sure what they would be willing to do.



Q.12: The solar energy industry has developed solar water heating systems for homes that look just like a skylight and can be easily installed on a home while it is being built. These systems require very little maintenance, and provide a large amount of the household hot water needs year around. If you had been aware of this type of solar water heating system when your house was being built, how much more per month would you have been willing to spend on your mortgage payment to have the system installed?

INTEREST LEVEL IN NEW SOLAR WATER HEATING SYSTEMS IF IT WERE BREAK EVEN

Among the six in ten respondents who are not willing to pay more on their mortgage to have solar water heating, one in five of those (21%) express strong interest in solar if they would break-even.

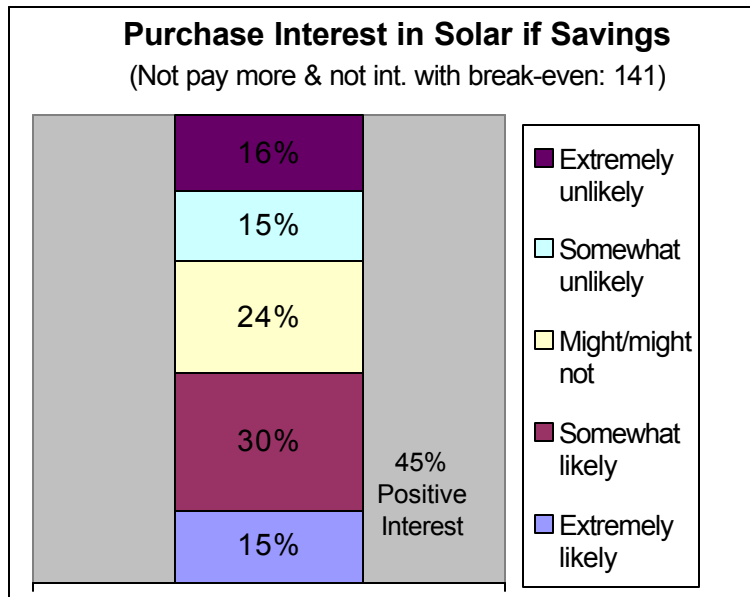


Q.13: If you knew that the savings on your monthly utility bill would completely offset the additional cost of the system on your monthly mortgage payment, meaning your out-of-pocket expenses would be zero, how likely would you be to have the system installed?

INTEREST LEVEL IN NEW SOLAR WATER HEATING SYSTEMS WHEN FINANCIALLY AHEAD

Almost half of respondents in total continue to express ambivalence or negative interest in solar water heating, even if they knew they would break-even financially.

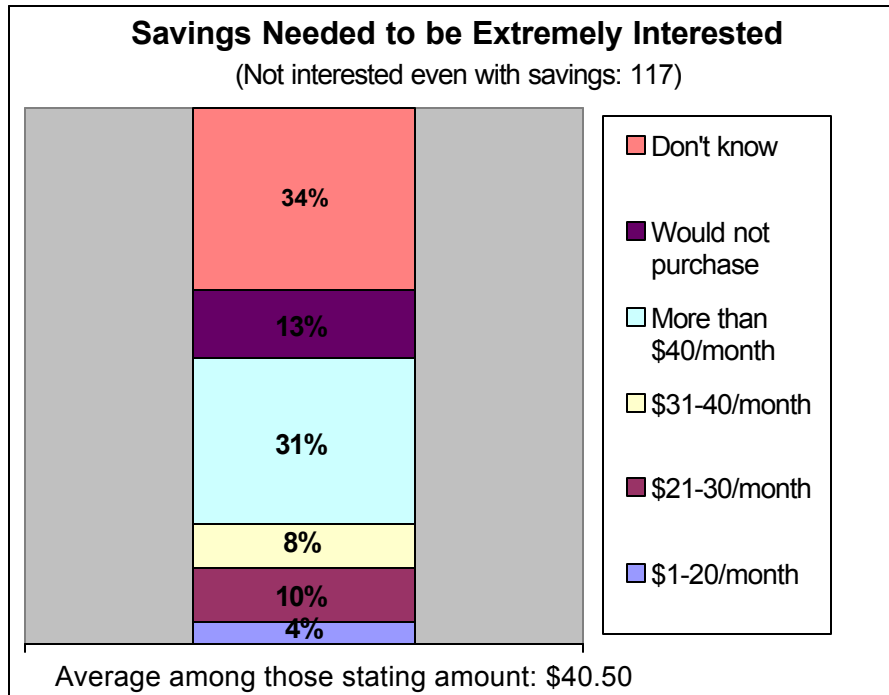
As shown, among those who are not interested in solar even if they could break-even, over half (55%) would still not be at all interested in solar even if they could save money. And another three in ten (30%) are only somewhat likely to consider solar.



Q.14: If the savings on your monthly utility bill were greater than the additional monthly mortgage payment, meaning that you would pay less per month than without a solar system, how likely would you be to have the system installed?

SAVINGS REQUIRED TO ELICIT STRONG PURCHASE INTEREST

Four in ten respondents do not express strong positive interest in solar water heating, even if they would save money each month. Among these respondents, one in five state that they would never purchase solar. Further, among respondents who are not interested in solar, they would only be convinced to purchase solar if they could expect an unrealistic monthly savings of \$40 or more per month.

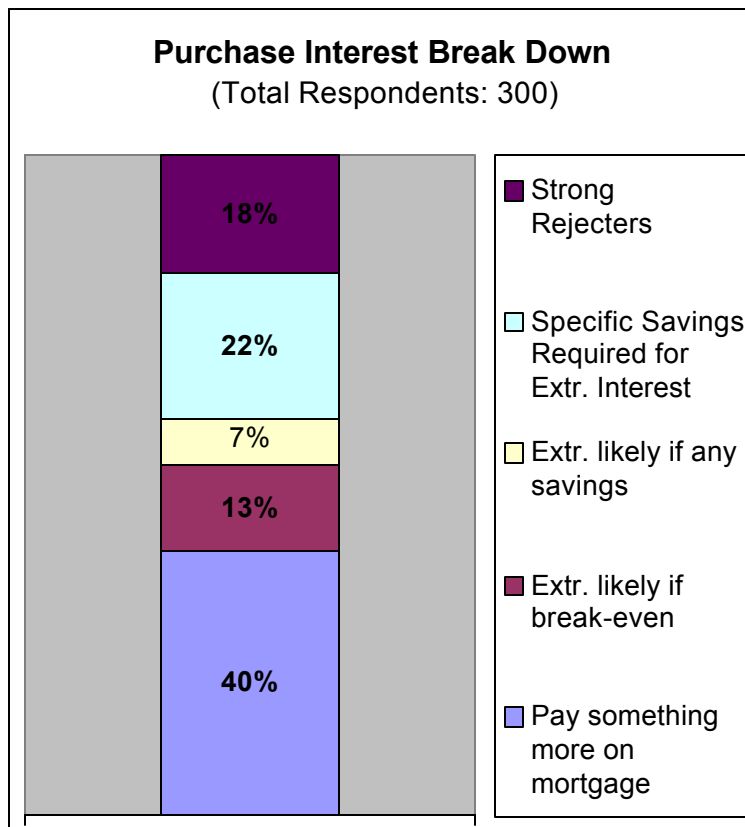


Q.15: How much per month would you need to save before you would be "extremely likely" to install a solar water heater in your home?

PURCHASE INTEREST SUMMARY

To summarize levels of interest, the table below shows the portion of respondents in total who express strong likelihood of purchasing solar water heating under each sequential scenario.

Specifically, as previously noted, four in ten respondents indicate that they would be willing to pay something extra on their mortgage in order to have solar water heating. An additional thirteen percent of total respondents are extremely likely to purchase solar if they were assured of breaking-even financially. Another seven percent are extremely likely to purchase with the promise of monthly financial savings. It appears that four in ten respondents are unlikely to ever purchase a solar water heater. About half of these rejecters would not ever purchase solar, and half probably would not purchase because they are expecting unrealistic levels of monthly savings.



RESPONDENT PROFILES

HOMES

Three-fourths of all respondents have lived in their current homes less than one year, with the average home size being 2,283 square feet.

	<u>Total</u> <u>(300)</u>	<u>Florida</u> <u>(100)</u>	<u>Arizona</u> <u>(100)</u>	<u>California</u> <u>(100)</u>
<u>Age of Home</u>				
Less than one year	77	74	81	76
1-2 years	20	23	17	20
3 or more years	3	2	2	4
<u>Home Size</u>				
Under 1,500 sq. ft.	13	9	18	12
1,500-2,599 sq. ft.	60	64	63	54
2,600-3,599 sq. ft.	21	18	17	27
3,600 sq. ft. or more	5	9	2	5
Mean square feet	2,283	2,383	2,124	2,343

DEMOGRAPHICS

Respondents in this survey were predominantly male, just over forty years of age on average, married with three in the household on average. The majority of respondents are college graduates or more who work in a variety of occupations, and earn over seventy thousand dollars a year on average.

	<u>Total</u> (300)	<u>Florida</u> (100)	<u>Arizona</u> (100)	<u>California</u> (100)
<u>Sex</u>				
Male	74	63	76	82
Female	26	37	24	18
<u>Age</u>				
30 or younger	21	12	32	17
31-40	36	34	34	40
41-50	22	19	18	29
51 or older	21	35	16	13
Mean age:	41.8	46.2	38.2	40.9
<u>Marital Status</u>				
Married	84	84	90	79
Single	9	7	7	13
Widow/Div/Sep	6	9	3	7
<u>Number in HH</u>				
One	7	7	6	8
Two	40	46	36	38
Three	19	16	19	21
Four or more	34	31	39	32
Mean # in HH:	3.0	2.7	3.1	3.0
<u>Education</u>				
High School or less	18	22	22	11
Tech school/some college	26	24	26	28
College grad	38	38	42	35
Grad school	17	16	10	25
<u>Employment</u>				
Managerial	16	8	15	24
Technical	14	15	13	13
Executive	8	5	2	17
Skilled labor	6	4	8	5
Clerical	4	6	4	2
Miscellaneous	33	31	39	28
Homemaker	4	8	5	-
Retired	13	21	10	9
<u>HH Income</u>				
Under \$40,000	14	16	17	8
\$40,000-\$59,999	24	26	27	18
\$60,000-\$79,999	18	18	24	12
\$80,000-\$99,999	12	11	10	15
\$100,000 or over	17	13	10	27
Refused	16	16	12	20
Mean HH income in 000's:	\$71.8	\$67.6	\$65.1	\$83.7

APPENDIX

- Questionnaire

<u>Market</u>	
Florida	()
Arizona	()
California	()

(I.D. Number)

SCREENING QUESTIONNAIRE

SOLAR WATER HEATING STUDY

JANUARY, 1998

Respondent's Name: _____		
Address: _____		
City/State: _____	Zip: _____	
Phone #: (____) _____		
Interviewed by: _____	Date: _____	
Validated by: _____	Date: _____	
Time Started: _____	Time Completed: _____	Elapsed Time: _____

ASK TO SPEAK WITH THE NAME ON THE LIST OR THE MALE OR FEMALE ADULT HEAD OF HOUSEHOLD.

Hello, I'm _____ from CRS Research, a national market research firm. We are conducting a survey among new home buyers and would like to ask you a few questions. It will only take 10 minutes of your time, and I can assure you that we are not selling anything, and that all of your responses will be strictly confidential.

A. RECORD SEX: (By observation only)

- Male ()
Female ()

B. Do you own the home that you are currently living in?

- Yes () → CONTINUE
No () → THANK AND TERMINATE

Q.B TERMINATIONS – NOT HOMEOWNER									
0	1	2	3	4	5	6	7	8	9

C. Is this home a ...(READ LIST)

- Single family unit () → CONTINUE
Townhome or condominium () → THANK AND TERMINATE. CIRCLE NEXT AVAILABLE NUMBER BELOW. ERASE AND REUSE SCREENER.

Q.C TERMINATIONS – NOT SINGLE FAMILY										
0	1	2	3	4	5	6	7	8	9	

D. How long have you owned this home?

- One year or less () → CONTINUE
Longer than one year () → THANK AND TERMINATE. CIRCLE NEXT AVAILABLE NUMBER BELOW. ERASE AND REUSE SCREENER.

Q.D TERMINATIONS – LONGER THAN 1 YR.										
0	1	2	3	4	5	6	7	8	9	

E. What is the age of this home? (READ LIST AND CHECK ONE.)

- Less than one year old ()
One to two years old ()
Two to five years old ()
Six to ten years old ()
Over ten years old ()

F. Which of the following most accurately describes the manner in which the water in your home is heated? (READ LIST)

- Natural gas () → CONTINUE
Electricity or heat pump () → CONTINUE
Solar () TERMINATE. CIRCLE NEXT
Gas & solar combined () AVAILABLE NUMBER IN BOX BELOW
Electricity & solar combined () ERASE AND REUSE SCREENER
(DO NOT READ) Do not know ()

Q.F TERMINATIONS – HAVE SOLAR										
0	1	2	3	4	5	6	7	8	9	

IF RESPONDENT REFUSES TO CONTINUE OR QUILTS IN THE MIDDLE, TERMINATE. CIRCLE NEXT AVAILABLE NUMBER IN BOX BELOW. ERASE AND REUSE SCREENER.

TERMINATIONS – QBR/BREAKOFF										
0	1	2	3	4	5	6	7	8	9	

Market	
Florida	()
Arizona	()
California	()

(I.D. Number)

MAIN QUESTIONNAIRE

SOLAR WATER HEATING STUDY

JANUARY, 1998

- 1a. Please tell me all of the ways or methods that you know of to heat the water in your home. (DO NOT READ LIST. RECORD BELOW UNDER Q.1a - UNAIDED).
- 1b. (ASK FOR ALL NOT MENTIONED IN Q.1a) Have you ever heard of heating the water in your home using (type)? (RECORD BELOW UNDER Q.1b – AIDED)
- 1c. Thinking about all of the homes you have lived in during the past ten years, have you ever lived in a home that used (type) of water heating? (READ LIST AND RECORD UNDER Q.1c. – EVER USED)

	Q.1a Unaided	Q.1b Aided	Q.1c Ever Used
Electricity/Heat pump	()	()	()
Gas/natural gas.....	()	()	()
Electricity with solar.....	()	()	()
Gas with solar.....	()	()	()
Solar	()	()	()

(FOR THOSE AWARE OF SOLAR IN Q.1a OR Q.1b, ASK Q.2. OTHERWISE, SKIP TO Q.3)

2. From what sources have you heard anything about solar water heaters? (CHECK ALL THAT ARE MENTIONED)

- Builder()
- Have seen them on homes()
- Friend()
- Books/magazines()
- Internet.....()
- Direct mail piece()
- Advertising()
- Home shows.....()
- Other.....()
- Don't know.....()

3. What do you think the advantages of using solar energy to help heat the water in your home would be? What other advantages would there be? (CHECK ALL THAT APPLY)

- Save money.....()
- Use less gas/electricity.....()
- Better for the environment.....()
- Tax benefits()
- More hot water capacity.....()
- Other (Specify)_____ ()
- _____ ()
- None()
- Don't know()

4. What do you think the disadvantages of using solar energy to help heat the water in your home would be? What other disadvantages would there be? (CHECK ALL THAT APPLY)

- Units do not look good on homes/appearance()
- Too much maintenance()
- One more piece of equipment to break down.....()
- Not as much hot water capacity.....()
- Takes longer to get hot water()
- Too expensive to install()
- Not save any / enough money.....()
- Never thought about it.....()
- Other (Specify)_____ ()
- _____ ()
- None()
- Don't know.....()

5. Did any of the new home communities you visited offer solar water heating?

- Yes.....()
- No.....()
- Did not visit any new home communities()

6. Did you consider a solar water heater when you recently purchased this home?

- Yes () → ASK Q.7
- No () → SKIP TO Q.8

7. Why did you decide against purchasing a solar water heating unit? (CHECK ALL THAT APPLY, THEN SKIP TO Q.9)

8. Why did you not consider a solar water heater when you purchased this home? (CHECK ALL THAT APPLY)

CHECK HERE FOR Q.7 OR8

- Just didn't think about it.....()
- Too expensive to purchase and install.....()
- Not attractive / unsightly.....()
- Builder never mentioned it.....()
- Builder recommended against it.....()
- Friend recommended against it.....()
- Too difficult to install.....()
- Not save any/enough money.....()
- Was not comfortable with the contractor.....()
- Do not know enough about it.....()
- Other (Specify) _____
_____.....()
- Don't know.....()

9. Which of the following statements is most accurate? If my builder had mentioned that solar water heaters were available... (READ LIST AND CHECK ONE)

- I would have seriously considered installing a solar water heater,.....()
- I would have wanted to learn more about solar water heating, or.....()
- I would probably not have considered installing a solar water heater.....()

10. If a solar water heater had been standard on your home, how would it have affected your interest in purchasing this home? Would it have.. (READ LIST AND CHECK ONE)

- Made you more interested in purchasing.....() → SKIP TO Q.12
- Made no difference in your interest in this home....() → SKIP TO Q.12
- Made you less interested in purchasing.....() → ASK Q.11

11. Why is that? (PROBE:) Why else?

12. The solar energy industry has developed solar water heating systems for homes that look just like a skylight and can be easily installed on a home while it is being built. These systems require very little maintenance, and provide a large amount of the household hot water needs year around. If you had been aware of this type of solar water heating system when your house was being built, how much more per month would you have been willing to spend on your mortgage payment to have the system installed? (CHECK ONE)

I would not want solar()
Zero / none() CONTINUE
Not sure / don't know()

\$1 - 10 per month() SKIP TO Q.16
\$11 - 20 per month()
\$21 - 40 per month()
More than \$40 per month.....()

13. If you knew that the savings on your monthly utility bill would completely offset the additional cost of the system on your monthly mortgage payment, meaning your out-of-pocket expenses would be zero, how likely would you be to have the system installed? Would you be...(READ LIST)

Extremely likely() →SKIP TO Q.16

Somewhat likely.....()
Might or might not.....()
Somewhat unlikely.....()
Extremely unlikely.....()

14. If the savings on your monthly utility bill were greater than the additional monthly mortgage payment, meaning that you would pay less per month than without a solar system, how likely would you be to have the system installed? Would you be...(READ LIST)

Extremely likely() →SKIP TO Q.16

Somewhat likely.....()
Might or might not.....()
Somewhat unlikely.....()
Extremely unlikely.....()

15. How much per month would you need to save before you would be “extremely likely” to install a solar water heater in your home?

- \$1 – 10 per month()
- \$11 – 20 per month.....()
- \$21 – 30 per month.....()
- \$31 – 40 per month.....()
- More than \$40()
- Would not purchase()
- Don't know.....()

16. How much do you think that a typical solar water heating system costs, fully installed?
(WRITE IN DOLLAR AMOUNT)

(Amount) \$ _____
Not sure / don't know()

17. Using a scale of one to five, where a one means “not at all important” and a five means “very important,” how important would each of the following things be in your decision to purchase a solar water heating system for your home if you had been interested in one?
(READ EACH ITEM, AND CHECK ONE BOX FOR EACH.)

START WITH X'd	Not important					Very Important				
	1	2	3	4	5					
() The price of the system fully installed	()	()	()	()	()	()	()	()	()	()
() The amount of maintenance required	()	()	()	()	()	()	()	()	()	()
() Helping to clean the air.....	()	()	()	()	()	()	()	()	()	()
() A builder recommendation.....	()	()	()	()	()	()	()	()	()	()
() Receiving tax benefits.....	()	()	()	()	()	()	()	()	()	()
() The size and appearance of the system.....	()	()	()	()	()	()	()	()	()	()
() Money saved on water heating bills each month.....	()	()	()	()	()	()	()	()	()	()
() The hot water delivery capacity of the system.....	()	()	()	()	()	()	()	()	()	()
() Ability to finance the system on your mortgage.....	()	()	()	()	()	()	()	()	()	()
() The brand name on the equipment	()	()	()	()	()	()	()	()	()	()
() The type of warranty provided.....	()	()	()	()	()	()	()	()	()	()
() Increased value of the home	()	()	()	()	()	()	()	()	()	()

18. Now lets use a scale of one to five again, only now a one means “completely disagree” and a five means “completely agree,” how much do you agree or disagree with each of the following statements? (READ EACH ITEM, AND CHECK ONE BOX FOR EACH.)

START WITH X'd	Disagree			Agree	
	1	2	3	4	5
<input type="checkbox"/> A solar water heating unit would make economic sense.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> A solar water heating unit would require very little maintenance.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> I like the idea of using clean energy and helping the environment.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> The savings on my monthly energy bills would outweigh the cost of purchasing the solar unit.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Solar water heating systems should be offered as standard equipment on all new homes being built.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Now, I'd like to ask you some questions to help us classify you with the other participants in this survey.

19. Please tell me which category best describes your age? (READ LIST)

- 20 yrs. of age or younger
- 21-30 years.....
- 31-40 years.....
- 41-50 years.....
- 51-60 years.....
- 61-70 years.....
- 71 or older.....

20. Including yourself, how many people are currently living in your household?

- One
- Two
- Three
- Four.....
- Five
- Six or more

21. What was the last grade of school you completed?

- Less than high school graduate()
- High school grad/GED.....()
- Technical school / trade school.....()
- Some college.....()
- College grad()
- Graduate school.....()

22. What is your marital status?

- Married()
- Single.....()
- Sep/Widowed/Divorced ()
- Other.....()

23. What is your current occupation? (PROBE FOR TITLE/INDUSTRY)

(TITLE) _____
(INDUSTRY) _____

24. Which of the following best describes the size of your current home? (READ LIST.)

- Under 1,500 square feet....()
- 1,500 – 2,500 square feet..()
- 2,600 – 3,500 square feet..()
- 3,600 – 4,500 square feet..()
- Over 4,500 square feet.....()

25. Please tell me which of these categories best describes your total annual household income before taxes. (READ LIST)

- Under \$20,000()
- \$20,000 – 29,999.....()
- \$30,000 – 39,999.....()
- \$40,000 – 59,999.....()
- \$60,000 – 79,999.....()
- \$80,000 – 99,999.....()
- \$100,000 or over.....()

Refused.....() → DO NOT READ

THANK YOU VERY MUCH FOR PARTICIPATING IN THIS SURVEY!

REPORT DOCUMENTATION PAGE

Form Approved
OMB NO. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE January 1999	3. REPORT TYPE AND DATES COVERED Subcontract Report	
4. TITLE AND SUBTITLE Report on Solar Water Heating Quantitative Survey			5. FUNDING NUMBERS SH71.5004	
6. AUTHOR(S) Focus Marketing Services				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Focus Marketing Services 2899 Agoura Road, Ste. 223 Westlake Village, CA 91361 National Renewable Energy Laboratory 1617 Cole Boulevard Golden, Colorado 80401-3393			8. PERFORMING ORGANIZATION REPORT NUMBER SR-550-26484	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Energy 1000 Independence Ave., SW Washington, DC 20585			10. SPONSORING/MONITORING AGENCY REPORT NUMBER SR-550-26485	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT National Technical Information Service U.S. Department of Commerce 5285 Port Royal Road Springfield, VA 22161			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This report details the results of a quantitative research study undertaken to better understand the marketplace for solar water-heating systems from the perspective of home builders, architects, and home buyers.				
14. SUBJECT TERMS water heating, solar water heating			15. NUMBER OF PAGES 50	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT unclassified	20. LIMITATION OF ABSTRACT UL	